

EXFOR database and recent changes

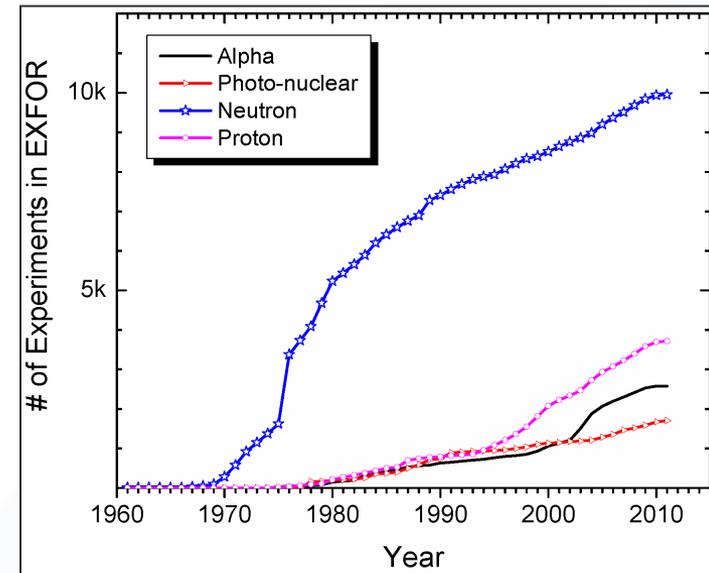
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EXFOR (Experimental Format)

- Compilation of experimental nuclear reaction data
 - Mostly Neutrons
 - Recently, charged particles and photonuclear
 - **19633 experiments** as of November 1, 2012
- In support ENDF and research activities
- Truly international project: NNDC, NEA, IAEA, Obninsk
- EXFOR should have broad user base in order to prosper



EXFOR User Groups

- **CSEWG:**
 - 1) Great relations is a big plus
 - 2) CSEWG should ask more from EXFOR, more proactively use experimental data in evaluations
 - 3) EXFOR compilations help ENDF evaluations, and original data for compilations should be shared by experimentalists when possible
- Nuclear Medicine: σ , yield data for β^+ , γ with $T_{1/2}$ ~few days
- **Nuclear Astrophysics:** n-,p-induced reactions, kT ~8-500 keV
- Cooperation with large nuclear science projects: NIF, FRIB
- Higher Education

FY 2012 EXFOR Operation

- **NNDC overall operation management for USA & CANADA:**
 - 32 new + 5 serious modifications
 - Atlas of Neutron Resonances integral values compilation, more than 1,400 subentries
 - Web and database monthly updates and management
 - Overall management of EXFOR contractors over seas
- Bratislava: 23N + 54C + 9P = 86 articles
- Sarov: 3 new + 387 modified
- Vienna: Processing, correcting and final submitting
- Total compilations: 121 new, 392 modified

EXFOR Status

- EXFOR is in good shape
- SG 30 worked hard on quality improvements
- **Database ownership and its responsibilities**
- Do we have any outstanding issues that needed by physicists and engineers? Feedback from F. Kaeppler, S. Mughabghab
- Somewhat selective coverage that produced plenty of missing entries or gaps in existing EXFOR data
- How we can make EXFOR better?

EXFOR Horizontal Checks

■ KADONIS:

- 1) Many references were missing from EXFOR
- 2) Incomplete compilations: rp only no σ
- 3) **These problems can be detected by users only!!!**
- 4) KADONIS was compiled by IAEA

■ Atlas of Neutron Resonances:

- 1) More than 1,400 subentries with integral values, no rp were compiled at NNDC, 2 months of back breaking work
- 2) Memo for complex values in elastic scattering amplitudes
- 3) EXFOR compilers were skipping difficult subjects
- 4) EXFOR compilers were also avoiding complex articles
- 5) **Check of Atlas references has yet not been done**

EXFOR Web

- Viktor Zerkin (IAEA) developed Web Interfaces:
 - Correction of data sets using new monitors
 - Direct PDF access for evaluators at IAEA and NNDC

The screenshot displays the EXFOR Web interface, which is a web-based tool for searching and analyzing experimental nuclear reaction data. The interface is organized into several sections:

- Header:** Includes the EXFOR logo, the title "Experimental Nuclear Reaction Data (EXFOR)", and the database version "Database Version of September 26, 2012".
- Search Results:** A list of search results is shown, including the date of the search, the number of reactions found, and the number of datasets.
- Data Selection:** A section for selecting data, including options for "Selected", "Unselected", "CAH", and "Reset". It also includes options for "Output" (EXFOR, Bibliography, TAB, C4, PlotC4) and "Plot" (Quick-plot, Advanced plot).
- Output Data:** A table showing the output data for a specific request, including the format, data size, and the number of datasets.
- Requested corrections:** A section for requesting corrections to the data, including a list of corrections and a "Correction protocol" section.
- Plot:** A plot showing the cross-section (barns) versus incident energy (MeV). The plot includes data points with error bars and a legend.

EXFOR-NSR Integration

- EXFOR lost in the past
- There is a strong need for data completeness
- NSR can help
- AJ and AJ Lehigh University compilations
- Only, ~60% of the data is available

Request #5577
Access-Level=2
Results: Reactions: 9 Datasets: 142

Data Selection
Retrieve Selected Unselected All Reset

Output: X4+ EXFOR Bibliography TAB C4 PlotC4
Plot: Quick-plot (cross-sections only) Advanced plot [how-to] using C5 and converting ratios to cross sections using [IAEA-standards,2006]
Narrow Energy (optional), eV: Min: Max:
 Apply(1A) Data re-normalization (for advanced users, results in: C4, TAB and Plots)

n	Display	Year	Author-1	Energy range,eV	Points	Reference	Subentry# NSR-key
1	Info X4+ X4± T4 Cov	2010	A.Matic+		0	[pdf]+ J,EN/C/CS,8,07006,2010	23133002
2	Info X4+ X4± T4 Cov	2009	F.Atchison+	2.00e-7	1	[pdf]+ J,NM/A,608,144,2009	23102002
3	Info X4+ X4± T4 Cov	2008	M.Mazari+	1.30e7 1.62e7	7		30037003
4	Info X4+ X4± T4 Cov	1994	G.Rohr+	2.50e5 2.00e7	49709	+ C,9NGATLIN,,215,199405	22331004
5	Info X4+ X4± T4 Cov	1993	R.W.Finlay+	5.29e6 6.00e8	474	[pdf]+ J,P/C/47,237,9301	13569008 1993FI01
6	Info X4+ X4± T4 Cov	1993	W.Abfaltered+	5.00e6 7.00e6	514	[pdf]+ J,P/C/47,1033,1993	14184002 1993AB03
7	Info X4+ X4± T4 Cov	1991	J.R.Morales+	1.76e7 1.98e7	2	[pdf]+ J,NM/A,300,312,1991	30764004 1991M009
8	Info X4+ X4± T4 Cov	1990	L.Koester+	1.97e3	1	[pdf]+ J,Z/A,337,341,1990	22217011 1990K034
9	Info X4+ X4± T4 Cov	1988	J.Franz+	1.60e8 5.75e8	22	[pdf]+ J,N/A,490,667,88	22117005 1988FR23
10	Info X4+ X4± T4 Cov	1984	M.Ohkubo	9.84e3 9.35e5	10.0	+ W,OKUBO,8412	21926003 21926004
11	Info X4+ X4± T4 Cov			7.12e2 7.88e4	927		
12	Info X4+ X4± T4 Cov	1983	M.S.Gordon+	2.50e7 4.50e7	0	[pdf]+ P,NPL-951,40,8304	12839004
13	Info X4+ X4± T4 Cov	1981	V.E.Zhitarev+	2.05e-4 4.84e-4	8	+ J,AL,50,(5),350,198105	41323002
14	Info X4+ X4± T4 Cov	1980	D.C.Larson+	2.00e6 8.06e7	683	+ C,8EML,,277,8007	12882005
15	Info X4+ X4± T4 Cov	1979	L.Koester+	1.26e0 5.19e0	2	[pdf]+ J,Z/A,292,(1),95,1979	21660005 1979K026
16	Info X4+ X4± T4 Cov	1977	R.B.Royer+	1.86e2	1	[pdf]+ J,NM,145,245,1977	12661004
17	Info X4+ X4± T4 Cov	1976	D.R.Waymire+	5.22e6 7.24e6	20	+ W,WAYMIRE,19761108	20671002
18	Info X4+ X4± T4 Cov	1975	P.V.R.Murthy+	3.31e10 2.72e11	7	[pdf]+ J,N/B,92,269,197506	10403005
19	Info X4+ X4± T4 Cov	1975	U.M.Singh+	4.06e3 4.19e5	433	[pdf]+ J,P/C,11,1117,197504	10515004 1975SI05
20	Info X4+ X4± T4 Cov	1975	R.M.Ortega	1.84e7 2.20e7	11	[pdf]+ R,IIS-MF-1743,197505	30378006
21	Info X4+ X4± T4 Cov	1974	R.B.Schwartz+	4.95e5 1.61e7	3344	+ R,MIS-MONO-138,197401	10004002
22	Info X4+ X4± T4 Cov	1974	I.F.Bubb+	2.29e7 4.42e7	5	[pdf]+ J,C/P,52,648,197404	10379007 1974BU05
23	Info X4+ X4± T4 Cov			2.14e7 3.97e7	4		10379008 1974BU05
24	Info X4+ X4± T4 Cov	1974	R.D.Heuer	5.51e6 9.58e6	41	+ T,HEUER,74	20560003
25	Info X4+ X4± T4 Cov	1974	W.Dilig	1.88e1	1	[pdf]+ J,Z/A,29,1750,197411	20602005
26	Info X4+ X4± T4 Cov	1974	S.Mubarakmand+	1.70e6 1.43e7	12	[pdf]+ J,NM,115,345,197403	30305003 1974MU04
27	Info X4+ X4± T4 Cov	1973	W.Schimmerling+	3.79e8 1.73e9	15	[pdf]+ J,P/C,7,248,197301	10082004 1973SC01
28	Info X4+ X4± T4 Cov	1973	M.Cance+		0	+ W,CABE,7304	20406003
29	Info X4+ X4± T4 Cov	1973	J.Cabe+	3.00e4 1.20e6	514	+ R,CAR-4524,197311	20480005 1973CAXM
30	Info X4+ X4± T4 Cov	1973	E.Kondalath+	2.50e4	1	[pdf]+ J,NM,111,337,197308	30343003
31	Info X4+ X4± T4 Cov	1972	M.Aumann+	2.92e7 5.89e7	7	[pdf]+ J,P/C,5,1,197201	10230007 1972AU01
32	Info X4+ X4± T4 Cov	1972	G.R.Norman+	8.00e5 3.00e6	0	[pdf]+ J,C/P,50,2385,197210	10320000 1972NO10
33	Info X4+ X4± T4 Cov	1972	F.G.Perey+	1.87e5 4.86e7	3701	[pdf]+ R,0NL-4823,197212	10377000 1972PEZJ
34	Info X4+ X4± T4 Cov	1972	A.Steyerl+	3.26e-7 1.38e-5	31	[pdf]+ J,Z,250,166,197202	21017000
35	Info X4+ X4± T4 Cov	1971	D.G.Foster Jr+	2.27e6 1.40e7	243	[pdf]+ J,P/C,3,576,197102	10047015
36	Info X4+ X4± T4 Cov	1971	L.W.Jones+	2.56e10	1	[pdf]+ J,P/B,36,509,197110	10194006
37	Info X4+ X4± T4 Cov	1970	W.L.Lakin+	2.97e9	1	[pdf]+ J,P/B,31,677,197005	10196003
38	Info X4+ X4± T4 Cov	1970	S.S.Malik+	7.00e-2 8.35e-1	4	[pdf]+ J,NM,86,83,1970	10501003 1970MA66

Conclusion & Outlook

- The present state of EXFOR is strong
- We have to find new creative ways to make it better
- Extensive exchange of ideas between EXFOR community and its users
- We are looking for suggestions
- Many thanks to M.W. Herman, S.F. Mughabghab, S. Dunaeva and V. Zerkin for help and support